

Gilsonite in Asphalt

Interim Report

Experimental Feature X(03)09 – New Products

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INTRODUCTION

The Utah Department of Transportation, Region Three Construction sponsored a limited application of an old product, powdered gilsonite with melting reducing polymers to be used as an anti-stripping agent in Hot Mix Asphalt (HMA). The Utah Department of Transportation (UDOT) currently specifies a slurried, hydrated lime. The success of this application will offer two rather than one type of anti-strip agent used in HMA. Competition should produce economies in the price paid for HMA. The goal in this application is to make available another anti-stripping product.

TEST SECTION AND PRODUCT INSTALLATION

Location

The project is located on Southbound US 40 from MM 149.77 to MM 151.1. A 2" overlay using gilsonite was installed. The overlay was 24' wide on the outside traveled way heading southbound the full length of the project. The 2" overlay of HMA with gilsonite was placed on 2" HMA with lime.

Installation-October 21, 2003

The powdered gilsonite was introduced in the asphalt mix at the plant at a 1% by weight rate. The gilsonite was introduced into the counterflow continuous mix asphalt plant where the recycled asphalt is usually added. There was little problem with this application and the mix was not changed. The gilsonite people asked for a little hotter mixing temperature, about 335 degrees Fahrenheit. According to the plant operator he estimated the capacity was increased at least 10% and this does not include the BTU consumption of the heater/dryer that has decreased. The HMA was delivered to the jobsite and placed with normal paving procedures. Paving equipment consisted of shuttle buggy, paving machine and two vibrating rollers. Paving conditions mirrored that of lime slurry treated HMA.



Figure 1-Tacked HMA/Lime



Figure 2-Southbound US 40 Prepped



Figure 3-HMA Mat



Figure 4-Aggcoat Feed Process

FIELD AND LABORATORY TESTING

Nuclear density testing was performed by QA/QC testing laboratory.

UDOT Materials-Central performed sample testing for gradation, VMA, Voids, VFA, Hamburg, Rut and Fatigue.

UDOT Central Materials will obtain roadway samples and conduct the test for stripping-Hamburg Test.

FWD, Structural Adequacy, Rut Depth, Road Profile and IRI, Pavement roughness will not be performed as stated in the work plan because there is no full depth HMA that includes gilsonite on the project. The HMA with gilsonite is a 2" overlay on HMA with lime for anti-stripping. Tests obtained each year for the Hamburg Wheel will only result in how this 2" gilsonite treated overlay works placed on 2" of lime treated HMA.

INTERIM RESULTS

Six cores were cut from the roadway, three in the hot mix asphalt that used lime as an anti-stripping agent and three cores where the gilsonite was used as an anti-strip. The following result of the Hamburg rut test indicates that there is very little difference after a year in place.

The Hamburg rut test of November 2004, all tests passed the criterion allowed and except for the Core # 1 and #1A, they are almost a mirror of each other. The comparison between lime and gilsonite appear after one physical test to perform equally.

CONCLUSIONS/RECOMMENDATIONS

The test results are inconclusive at this time. This study will last for another three years to develop some comparison curves with more than one point.

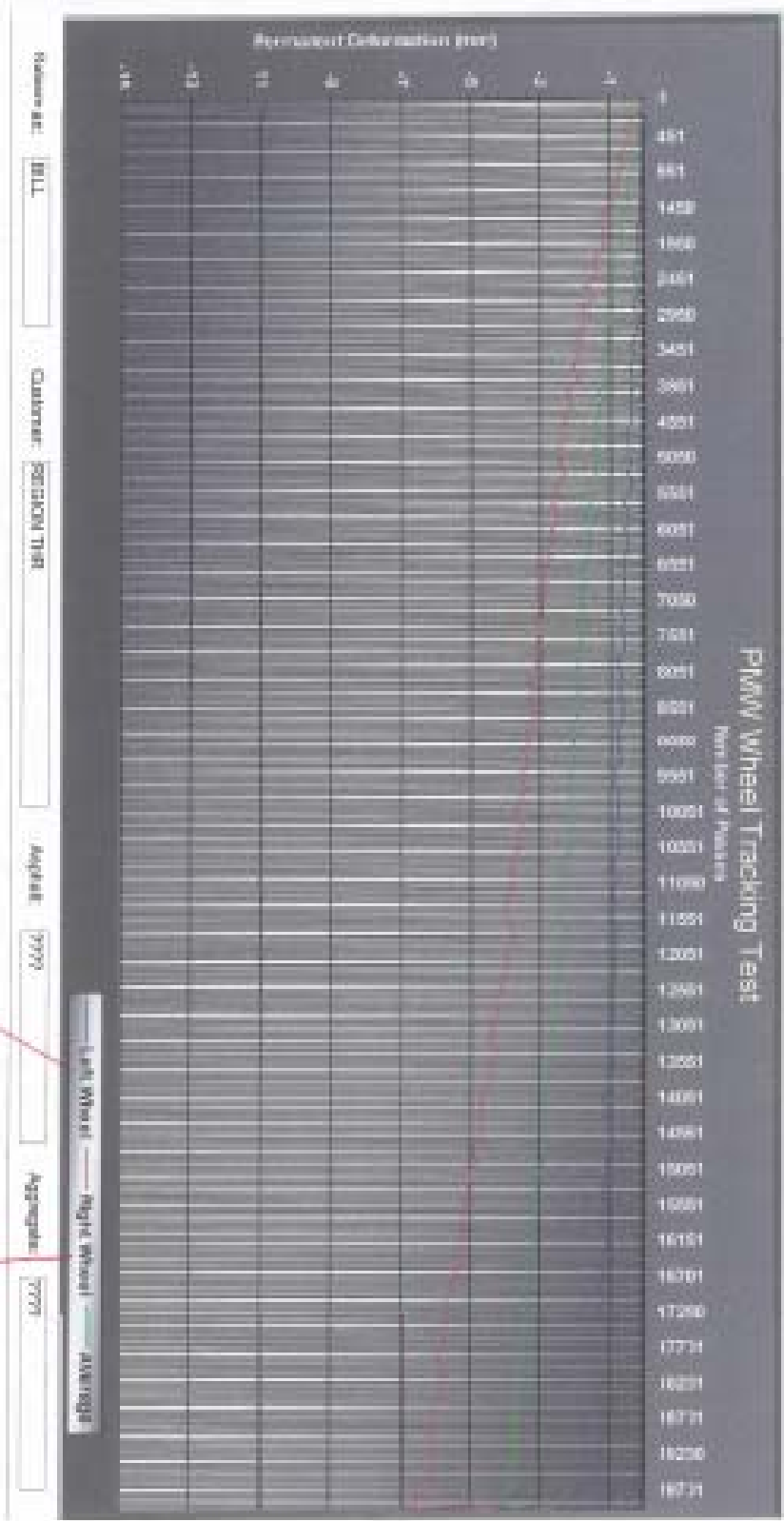
UTAH DEPARTMENT OF TRANSPORTATION REG ON THREE LAB OREM UTAH (1 M.P. 149.970 18' RT CL 0" to 1 5/8" (1 A.M.P. 149.970 18' RT OF CL 2 5/8" to 4 1/4")			
Project Name:	<input type="text" value="US-40 NAPLES 1 MILE EASTE"/>	Date:	<input type="text" value="11/18/2004"/>
Project Number:	<input type="text" value="NO NUMBER"/>	Date Sampled:	<input type="text" value="11/18/2004"/>
Job Number:	<input type="text"/>	Lab Number:	<input type="text"/>
Project Engineer:	<input type="text"/>	Mix Type:	<input type="text"/>
Submitted By:	<input type="text"/>	Asphalt Grade:	<input type="text" value="????"/>
		Pit Source:	<input type="text"/>
<div style="display: flex; justify-content: space-around; color: red; font-style: italic;"> Layer Below Aggregate Aggregate </div> <div style="display: flex; justify-content: space-around; color: red; font-style: italic;"> CORE #1-A CORE #2 </div>			
Maximum Impressions:	Right <input type="text" value="-7.76"/> mm Pass #: 19851	Left <input type="text" value="-2.70"/> mm Pass #: 19001	Average <input type="text" value="-5.23"/> mm
Failure Depth: 10 mm		PASSED	
PMW WheelTracking Test <div style="font-size: small; margin-bottom: 5px;"> Lab Number: 12 Project Name: US-40 NAPLES 1 MILE EASTE Test Date: 11/18/2004 14:00:00 Test Type: 2 Max Test Load: 4.00 kN Max Test Speed: 0.75 m/s </div>			
30:		MARK WHITE	

PMW Wheel Tracking Test

Speed:

Max Passes:

Project Name:



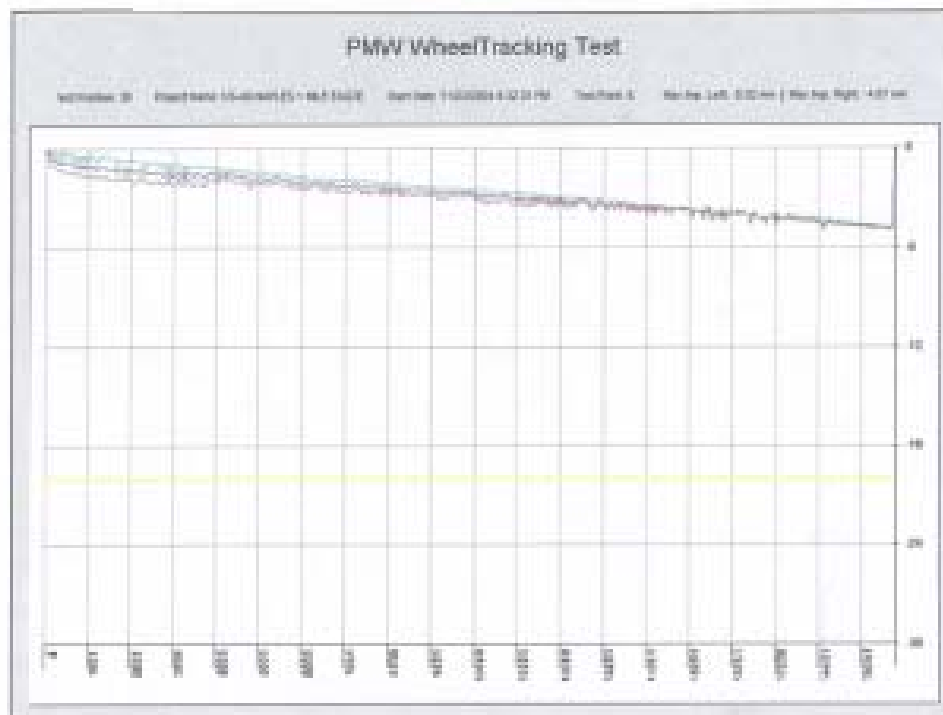
UTAH DEPARTMENT OF TRANSPORTATION
REGION THREE LAB OREM, UTAH
M.P. 149.670 (CORE 2 0" TO 1 5/8" 9' RIG.) (CORE 2-A 2 5/8" TO 3 1/4" 9' RIG. CL)

Project Name:	US-40 NAPLES 1 MILE EASTE	Date:	11/23/2004
Project Number:	NO NUMBER	Date Sampled:	11/23/2004
Job Number:		Lab Number:	
Project Engineer:		Mix Type:	
Submitted By:		Asphalt Grade:	????
		Pit Source:	

Layer Below Aggregate *Aggregate*
CORE # 2A *CORE # 2*

	Right	Left	Average
Maximum Impressions:	-5.43 mm	-5.62 mm	-6.03 mm
	Pass #: 19900	Pass #: 19950	

Failure Depth: 20 mm

PASSED

DO:

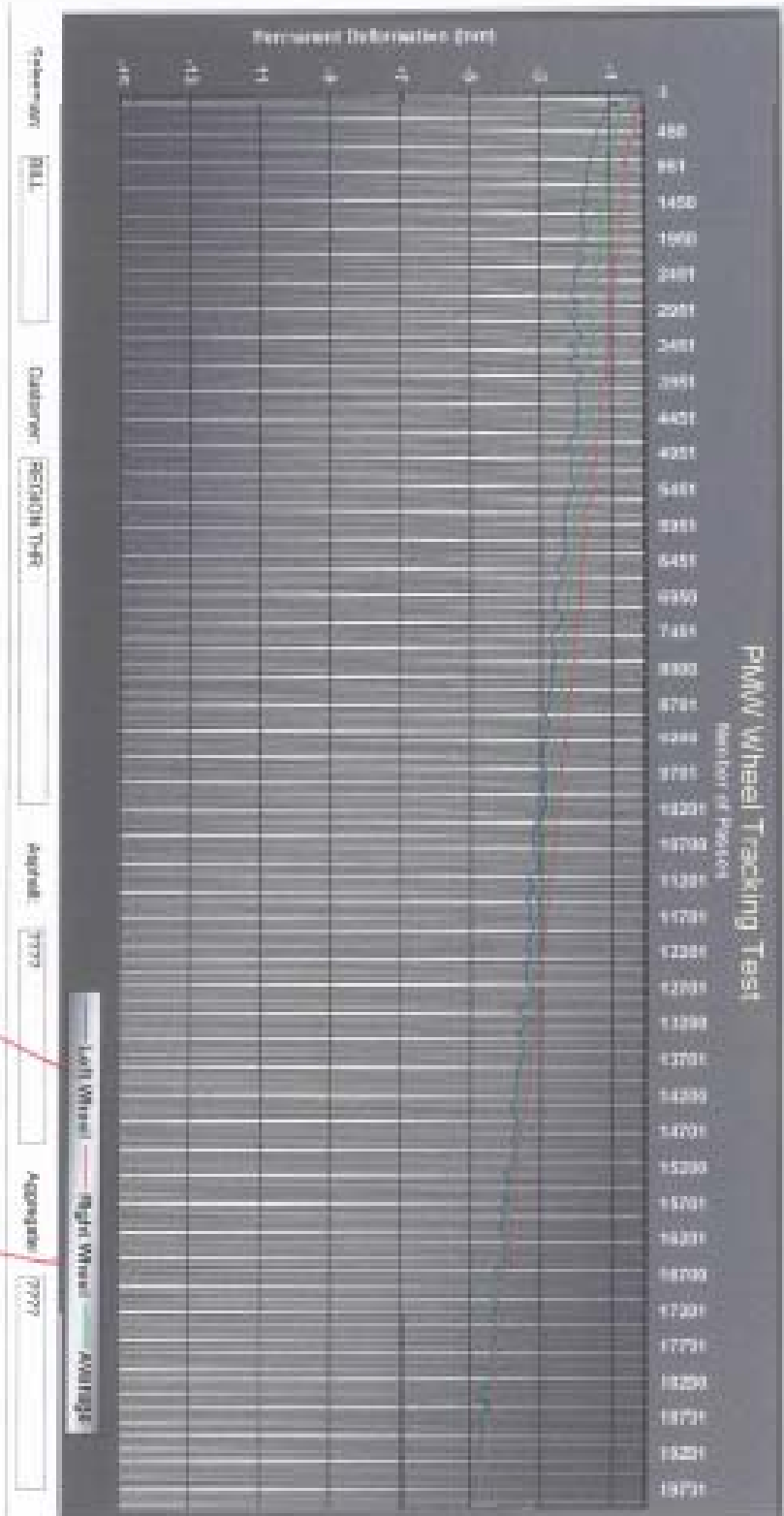
WILLIAM LAPSON

PMW Wheel Tracking Test

Speed:
Max Pkms:

Project Name:

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UTAH DEPARTMENT OF TRANSPORTATION
REGION THREE LAB DREM UTAH
 (CORE #3 M.P. 150.154-16' RT CL)(CORE #4 M.P. 158.154-8' RT CL)

Project Name:	US-40 NAPLES 1 MILE EASTE	Date:	11/15/2004
Project Number:	NO NUMBER	Date Sampled:	11/15/2004
Job Number:		Lab Number:	
Project Engineer:		Mix Type:	?????
Submitted By:	MACK HALL	Asphalt Grade:	????
		Pit Source:	??????

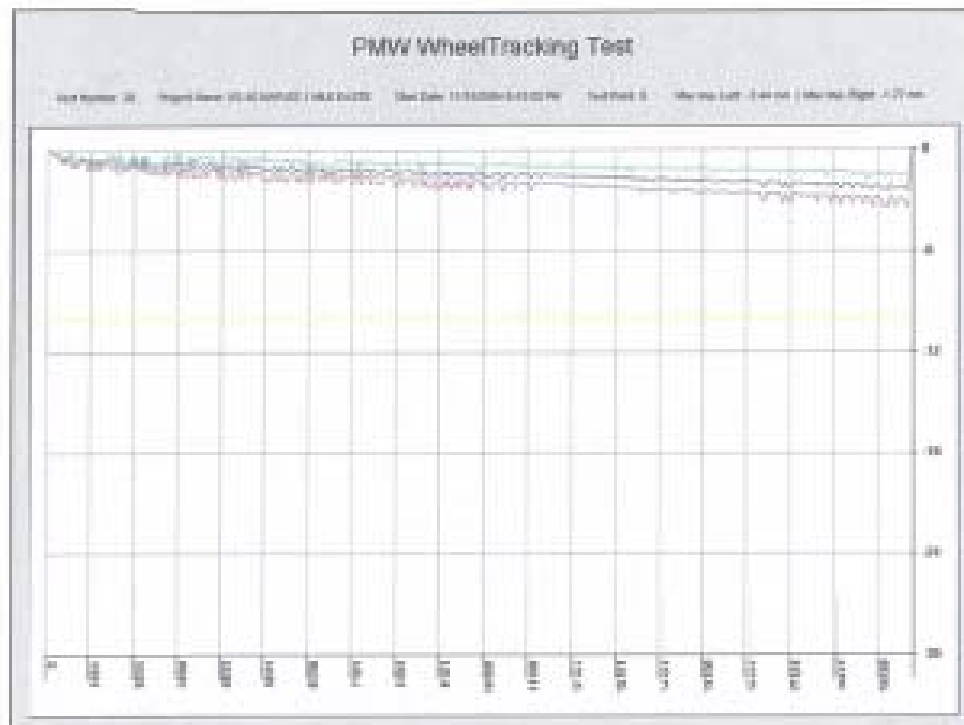
App.coate
CORE #4

App.coate
CORE #3

	Right	Left	Average
Maximum Impressions:	-2.58 mm	-4.44 mm	-3.51 mm
	Pass #: 20001	Pass #: 19651	

Failure Depth: 10 mm

PASSED



CC:

WILLIAM LARSON

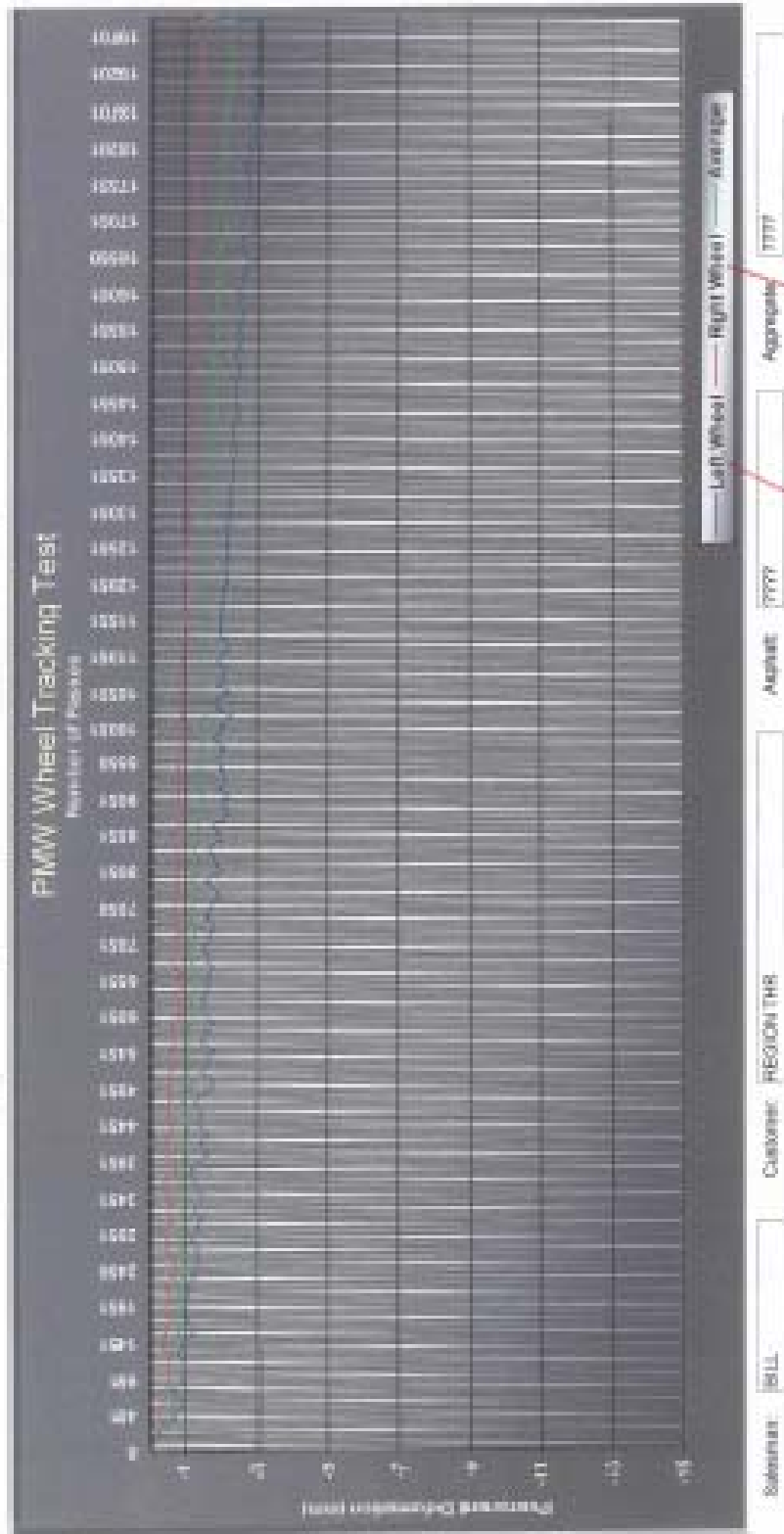
PMW Wheel Tracking Test

Project: 10

Track Press # 20,000

Project Name: US-40 IMPROVED 1 MILE EAST

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cores 3 & 4
Left Right
core # 3
core # 4

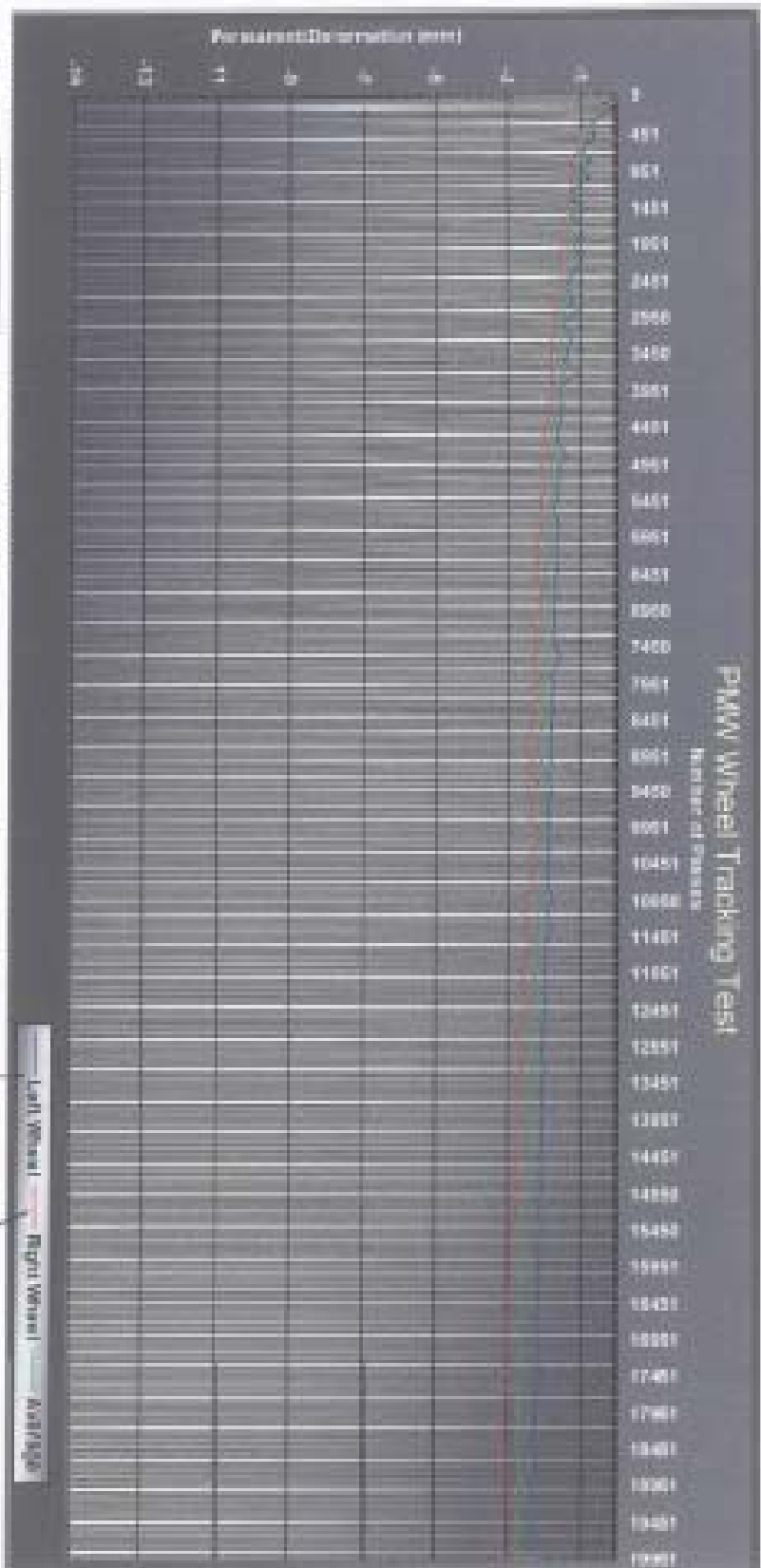
DEPARTMENT OF TRANSPORTATION REGION THREE LAB DREH UTAH M.P. 150.412(CORE 50" to 1 5/8" RT CL)CORE 50" to 1 5/8" 9 RT CL			
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Project Number:	<input type="text" value="NO NUMBER"/>	Date Sampled:	<input type="text" value="11/17/2004"/>
Job Number:	<input type="text"/>	Lab Number:	<input type="text"/>
Project Engineer:	<input type="text"/>	Mix Type:	<input type="text"/>
Submitted By:	<input type="text"/>	Asphalt Grade:	<input type="text" value="????"/>
		Pit Source:	<input type="text"/>
<div style="display: flex; justify-content: space-around; color: red; font-style: italic;"> Agg Core Core #6 Agg core Core #5 </div>			
Maximum Impressions:	Right <input type="text" value="-3.77"/> mm Pass #: 20001	Left <input type="text" value="-2.73"/> mm Pass #: 19851	Average <input type="text" value="-3.25"/> mm
Failure Depth: 10 mm	PASSED		
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<u>William Larson</u>			

PMW Wheel Tracking Test

Speed

Max Pass #:

Project Name:



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Cont # 6

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